

**ABSTRACT:****TRANSMISSION SIGNALS, METHODS AND APPARATUS**

This invention relates to apparatus, methods, processor control code and signals for channel estimation in OFDM (Orthogonal Frequency Division Multiplexed) communication systems with a plurality of transmitter antennas, such as MIMO (Multiple-input Multiple-output) OFDM systems.

An OFDM signal is transmitted from an OFDM transmitter using a plurality of transmit antennas. The OFDM signal is adapted for channel estimation for channels associated with said transmit antennas by the inclusion of orthogonal training sequence data in the signal from each said antenna. The said training sequence data is derived from substantially orthogonal training sequences of length  $K$  for each said transmit antenna, said orthogonal training sequences being constructed such that a minimum required sequence length  $K$  needed to determine a channel estimate for at least one channel associated with each said transmit antenna is linearly dependent upon the number of said transmit antennas.

Figure 5